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(REV. 9-2001)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5

10/009830

INTERNATIONAL APPLICATION NO.
PCT/GB00/02298

INTERNATIONAL FILING DATE
June 14, 2000

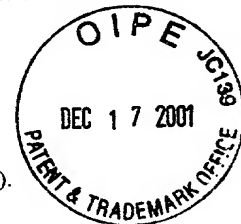
PRIORITY DATE CLAIMED
June 17, 1999

TITLE OF INVENTION
SECURING PLUGS IN OVER-SIZED HOLES

APPLICANT(S) FOR DO/EO/US
Alan STEPHENSON

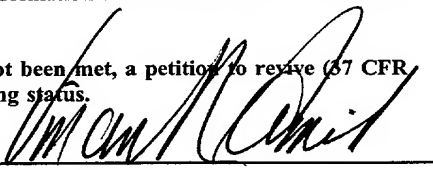
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).



Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☐ Other items or information:

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 10/009830		INTERNATIONAL APPLICATION NO. PCT/GB00/02298		ATTORNEY'S DOCKET NUMBER	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ --	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	22 - 20 =	2	x \$18.00	\$ 36.00	
Independent claims	1 - 3 =	0	x \$84.00	\$ 0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$ 0	
TOTAL OF ABOVE CALCULATIONS =				\$ 926.00	
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$ 463.00	
SUBTOTAL =				\$ 463.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ --	
TOTAL NATIONAL FEE =				\$ 463.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	
TOTAL FEES ENCLOSED =				\$ 463.00	
				Amount to be refunded:	\$
				charged:	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>463.00</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>50-1716A</u> duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.					
<p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <p>DILLER, RAMIK & WIGHT 7345 McWhorter Place; Suite 101 Annandale, VA 22003 (703) 642-5705</p>					
				 SIGNATURE Vincent L. Ramik NAME 20,663 REGISTRATION NUMBER	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Alan STEPHENSON

PCT/GB00/02298

International Filing Date: June 14, 2000

Filed in DO/US: December 17, 2001

SECURING PLUGS IN OVER-SIZED HOLES

December 17, 2001

Box PCT
Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Contemporaneously with the filing of the above-captioned patent application
and prior to examination on the merits, please amend this application as follows:

IN THE SPECIFICATION:

Page 1, before line 1, please insert the following heading:

-- TITLE OF THE INVENTION --;

and

Page 1, between lines 1 and 2, please insert the following heading:

-- BACKGROUND OF THE INVENTION --.

Page 2, between the second and third paragraph (lines 17 and 18), please insert the following heading:

-- SUMMARY OF THE INVENTION --.

Page 6, between the second and third paragraphs (lines 8 and 9), please insert the following heading:

-- BRIEF DESCRIPTION OF THE DRAWINGS --.

Page 7, after the second full paragraph (between lines 12 and 13), please insert the following heading:

-- DESCRIPTION OF THE PREFERRED EMBODIMENTS --.

Page 13, after line 14, insert the following new paragraph:

-- Although a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the apparatus without departing from the spirit and scope of the invention, as defined by the appended claims. --;

and

Page 13, last line, cancel the last sentence ("120:sp-asp13").

IN THE CLAIMS:

After the heading and before claim 1, insert the following new paragraph:

-- What is claimed is: --.

Please cancel all of the claims presently of record and substitute therefor the following newly drafted claims:

... claims begin on page 4...

(New) 26. A method of securing a screw (14) in a fixture (12), which method comprises the steps of:-

- (i) providing a plug (16) adapted to receive and frictionally hold therein said screw (14);
- (ii) pre-forming a hole (18) in the fixture (12);
- (iii) inserting said plug (16) in said hole (18); and
- (iv) applying said screw (14) to said plug (16) and rotating the screw (14) to advance it into engagement with and retention in the plug (16) thereby to secure the screw (14) in the fixture (12); and

which method includes, when said plug (16) does not engage with a wall defining said hole (20) in a manner sufficient to prevent rotation of the plug (16) with the screw (14) on rotation of the screw (14), said hole (20) being thus over-sized in relation to the plug (16) and the plug (16) being carried only loosely in the hole (20), an improvement which comprises the following steps:-

(a) providing at least one piece of a loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is sized to envelop at least circumferentially the plug (16);

(b) withdrawing the plug (16) from said hole (20) and enveloping it at least circumferentially in the fabric piece (26 or 30);

(c) causing activation of the filler material (28) thereby to initiate hardening and eventual setting of the filler material (28); and

(d) inserting the enveloped plug (16,26,28) without delay in

the oversized hole (20) in a manner such as to ensure filling of the oversized hole (20) with the enveloped plug (16,26,28), thereby when said filler (28) has hardened to prevent rotation of the plug (16) on rotation of the screw (14) to advance it into the plug (16).

(New) 27. A method according to claim 26, wherein the filler material (28) is air activated.

(New) 28. A method according to claim 27, wherein the filler material (28) comprises a polyurethane resin.

(New) 29. A method according to claim 26, wherein the filler material (28) is water activated.

(New) 30. A method according to claim 29, wherein the filler material (28) comprises plaster of Paris.

(New) 31. A method according to claim 29, wherein the filler material (28) comprises a quick-setting material manufactured from gypsum, other than plaster of Paris.

(New) 32. A method according to claim 26, wherein the filler material (28) has mixed in with it short, strength-enhancing fibres of a material capable of strengthening the filler material when set.

(New) 33. A method according to claim 26, wherein the fabric

piece (26) is in the form of a tape (34), and is wound on to the plug (16) thereby to envelop it circumferentially.

(New) 34. A method according to claim 26, wherein the fabric piece (30) is circular in shape, and is placed over the closed end of the plug (16) and then smoothed longitudinally along the plug (16) to the open end thereof so as to envelop the plug (16) circumferentially in a substantially uniform manner.

(New) 35. A method according to claim 26, wherein the fabric piece (30) is circular in shape, is placed symmetrically over the hole (20), and is pressed into the hole (20) by the closed end of the plug (16) on pressing the plug (16) into the hole (20), thereby to cause the fabric piece (26,28) to envelop the plug (16) circumferentially.

(New) 36. Means for practising a method according to claim 26, comprising a piece of loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is shaped and sized for use with the plug.

(New) 37. Means according to claim 36, wherein the filler material has mixed in with it short, strength-enhancing fibres of a material capable of strengthening the filler material when set.

(New) 38. Means according to claim 36, wherein the piece of filler material carrying fabric (30) is circular in shape.

(New)39. Means according to claim 36, wherein the piece of filler material carrying fabric (26) is rectangular in shape.

(New)40. Means according to claim 36, wherein the piece of filler material carrying fabric (26,28 or 28,30) is part of and is detachable from a tape (34) of said filler material carrying fabric, which tape is transversely weakened at positions (36) spaced along the tape (34) to enable ready detachment of successive pieces (38) as required for use.

(New)41. Means according to claim 40, wherein the filler material (28) has mixed in with it short, strength-enhancing fibres of a material capable of strengthening the filler material when set.

(New)42. Means according to claim 40, wherein the tape (34) is in the form of a roll (40).

(New)43. Means according to claim 40, wherein the tape (34) is folded upon itself at said weakened positions (36) in a fan-fold manner (42).

(New)44. Means according to claim 36, wherein said piece of filler material carrying fabric (26,28 or 28,30) is one of a plurality of said filler-carrying fabric pieces (26,30,38) enclosed in an enclosure means (32) arranged to prevent premature activation of the filler material (28).

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(New) 45. Means according to claim 44, wherein the enclosure means (32) incorporates a resealable closure means for enabling withdrawal of individual fabric pieces (26,30,38) one at a time.

(New) 46. Means according to claim 36, wherein the filler material carrying fabric (26,28 or 26,30) and the plug (16) are pre-united as a single unit ready for use when required.

(New) 47. A unit according to claim 46, wherein the filler material (28) has mixed in with it short, strength-enhancing fibres of a material capable of strengthening the filler material when set. -

IN THE ABSTRACT:

Please cancel the Abstract of the Disclosure of record and substitute therefor the newly typed Abstract of the Disclosure:

(New)

ABSTRACT OF THE DISCLOSURE

A method of securing a screw-receiving plug in an over-sized hole preformed in a fixture comprises the steps of: (a) providing at least one piece of a loosely-woven fabric carrying consolidated thereon a quick-setting filler material, which fabric piece is sized to envelop at least circumferentially the plug intended to be used; (b) enveloping the plug circumferentially in the fabric piece; (c) activating the filler material; and (d) inserting the enveloped plug in the hole in a manner such as to ensure filling of the hole by the enveloped plug. On setting, the activated filler material and fabric restrain the plug against rotation when a screw is being driven into the plug thereby to secure the screw in the fixture. The preferred filler material is plaster of Paris.

... Remarks begin on page 10

REMARKS

Commensurate with the filing of this application, the Examiner is respectfully requested to introduce this amendment in order that the multidependent claims are cancelled and the new claims submitted are considered by the Examiner. The new claims have been drafted in the light of the contents of the International Preliminary Examination Report, which includes in relation to the original claim 21 the statement "The combination of features set out in claim 21, in which a screw is inserted in the plug, is not disclosed in, or suggested by the documents specified in the search report."

Upon entry of this amendment, favorable consideration on the merits of the claims is respectfully solicited.

Respectfully submitted,

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2/prts

PCT TEXT
JCT3 Rec'd PCT/PTG
AS FILED

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-1-

SECURING PLUGS IN OVER-SIZED HOLES

This invention relates to a method of securing plugs (particularly but not exclusively screw-receiving plugs) in oversized holes formed in fixtures, - thereby to enable, for example, screws, bolts or even nails to be secured in a fixture. The invention also provides means for use in carrying out that method.

In the description and claims that follow hereafter, the term "screws" will include "bolts" as well, and will encompass screws that have screw-threaded cylindrical shanks as well as screws having screw-threaded conical shanks.

Devices and appliances are frequently secured to a supporting fixture or structure (e.g. a wall, cabinet or panel) by means of screws. In some cases, such screws cannot be screwed directly into the structure because of the nature of the material of the structure, but instead are inserted into a plug of a screw-receiving material that has been previously inserted in a frictionally-engaging manner in a hole preformed in the structure. Driving the screw into the plug tends to radially enlarge the plug, thus causing the frictional engagement of the plug with the structure to intensify and thereby resist both longitudinal and rotational displacement of the plug within the hole as the screw is driven home to firmly secure the device or appliance to the structure.

Difficulties can arise in preforming the hole in the structure, for example - where the material of the structure is not homogeneous, or is easily eroded non-uniformly during the drilling of the hole. As a result, the hole is sometimes larger than desired (and/or misshapen) for the size of the plug intended to be engaged therein. This happens for example where the hole is being drilled in mortar bonds between bricks.

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In such cases remedial measures may include using a larger plug to receive the plug or screw originally intended to be used, or simply a larger screw; or alternatively filling the over-sized hole with a suitable homogeneous plastic filler material, and then redrilling the necessary plug-receiving hole in the filler material after it has hardened.

Unfortunately, the latter procedure unduly prolongs the time of securing the screw since the hardening of the filler material requires a relatively long setting time before it can safely carry a load, because of the bulk of the filler material to be hardened, and its almost complete enclosure in the hole. Suitable plastic fillers include epoxy resins, but they are relatively expensive, require special mixing procedures, have long hardening times, and can present problems in safe handling and storage, e.g. dermatological problems for the user.

The present invention seeks to provide a method and means for enabling plugs (e.g. screw-receiving plugs) to be secured in circumstances where the preformed hole is unfortunately enlarged beyond the intended size, which method and means do not require resort to the use of a larger plug or screw, or a long filler-hardening time.

According to the present invention, a method of securing a plug, for example a screw-receiving plug, in an over-sized preformed hole comprises the steps of: (a) providing at least one piece of a loosely-woven fabric carrying consolidated thereon a quick-setting filler material, which fabric piece is sized to envelop at least circumferentially the plug intended to be used; (b) enveloping the plug at least circumferentially in the fabric piece; (c) causing activation of the filler material thereby to initiate hardening and eventual setting of the filler material; and (d) inserting the enveloped plug without delay in the oversized hole in a manner such as to ensure filling of the

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The preferred water-activated filler material comprises plaster of Paris, though any other suitable filler material manufactured from gypsum will suffice.

- 5 If desired, the filler material may have mixed with it short, strength-enhancing fibres of glass, carbon or other suitable material.

- 10 The fabric piece may be in the form of a tape or strip, and be wound on to the plug thereby to envelop it circumferentially. Alternatively, the fabric piece may be circular in shape, or substantially so, and be placed over the closed end of the plug and then smoothed longitudinally along the plug to the open end thereof so as to envelop it
- 15 circumferentially in a substantially uniform manner.

- According to a further aspect of the invention, there is provided for use in the method of the present invention a piece of a loosely-woven fabric carrying consolidated
- 20 thereon a quick-setting filler material, which fabric piece is in the form of a tape which is transversely weakened at positions spaced along the tape so as to enable ready detachment of successive pieces as desired for use in practising a method according to the present invention.

- 25 Said filler material may, if desired, have mixed with it short, strength-enhancing fibres of glass, carbon or other suitable material.

- 30 The tape may be wound in the form of a roll, or alternatively it may be folded upon itself at said weakened positions in a fan-fold manner.

- Where air-activated filler material is used, it is
- 35 essential to enclose the fabric tape in an air-tight enclosure to prevent activation until the tape is about to be put into use.

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Other features of the present invention will appear from a reading of the description that follows hereafter and of the claims appended at the end of that description.

5 Various methods incorporating the present invention, of securing screws in a fixture, and means for use in practising those methods, will now be described by way of example, and with reference to the accompanying drawings, in which:

10 Figure 1 shows a vertical sectional view of part of an appliance secured to a vertical brick wall by conventional wood screws, the section being taken in the plane including the longitudinal axes of two screws;

15 Figures 2 and 3 show respectively rectangular and circular pieces of a woven fabric carrying an embedded filler material;

20 Figure 4 shows in a pictorial manner a plastic screw-receiving plug around which is being wound the rectangular fabric piece of Figure 2;

25 Figure 5 shows in a pictorial manner a plastic screw-receiving plug along which is being pressed and smoothed the circular fabric piece of Figure 3;

30 Figure 6 shows in a pictorial manner a plastic screw-receiving plug about to be forced longitudinally along with a circular fabric piece of Figure 3 into a hole preformed in the brick wall;

35 Figure 7 shows in a pictorial manner a resealable waterproof enclosure containing several rectangular filler-carrying fabric pieces of the kind shown in Figure 2;

Figure 8 shows in a pictorial manner a filler-carrying woven fabric tape for use in providing as required

detachable rectangular fabric pieces of the kind shown in Figure 2, the tape being wound in the form of a roll;

5 Figure 9 shows in a pictorial manner a filler-carrying woven fabric tape for use in providing as required detachable rectangular fabric pieces of the kind shown in Figure 2, the tape being folded in a fan-fold manner; and

10 Figure 10 shows in a pictorial manner a ready-made unit comprising a conventional plastic, screw-receiving plug such as is shown in Figures 4 and 5, having secured thereon a sleeve of a said loosely-woven fabric carrying an embedded filler material similar to the fabrics shown in the Figures 2 and 3.

15 Referring now to the drawings, an appliance 10 is to be secured to a brick wall structure 12 in the manner shown in Figure 1, by means of so-called 'wood screws' (i.e screws having screw-threaded conical shanks) 14, using plastic
20 plugs 16 of conventional kind disposed in suitably positioned holes 18, 20 preformed in the brick wall 12.

The intended positions of some of those holes (18) require drilling in the material of the bricks 22 themselves, so
25 that no difficulty is normally encountered in drilling them to a diameter that is correct for the intended plastic plugs.

30 However, the intended positions of other holes (20) coincide with respective mortar bonds 24 disposed between adjacent bricks 22. Due to the weakness of the mortar often used in such bonds 24, or the presence of small chippings or pebbles in the mortar, drilling of those holes
35 20 with the requisite masonry drill can result in holes that are somewhat oversized and/or badly mis-shapen, as indicated in Figure 1. As a consequence, the intended plastic plugs 16 are too small in diameter to frictionally engage with the encircling mortar, and so cannot receive

and secure the screws intended to be engaged in the plugs. Hence, when a fixing screw 14 is presented to the plug 16 and rotated, the screw and the plug rotate together.

5 In a first embodiment of the present invention, this difficulty is overcome, in accordance with the principles of the present invention, by providing for each such oversized or mis-shapen hole 20 at least one piece 26 of a loosely-woven fabric (for example - cotton) carrying
10 consolidated thereon a dry, water-activated, quick-setting filler material 28 (for example - plaster of Paris). Each such fabric piece 26 is sized to be capable of enveloping circumferentially at least a major part of the intended plastic plug 16 when engaged therearound.

15 The method of the present invention now involves for each plug 16 to be secured in a defective (i.e. over-sized or mis-shapen) hole 20, engaging one such fabric piece 26 securely around the plastic plug 16 so as to closely
20 envelop it circumferentially along its length.

The fabric piece 26 and filler material 28 are then wetted with water so as to activate the filler material 28, and thereby initiate its setting (hardening) process.

25 The wetted, enveloped plug (16,26,28) is then inserted without delay into the defective hole 20 so as to substantially fill it, the fabric piece 26 and filler material 28 then occupying the spaces between the plug 16
30 and the bore of the hole 20.

After the elapse of the requisite (relatively short) filler-hardening time, the intended screw 14 is inserted in and screwed into the plug 16. The whole process may
35 require only as little as five minutes.

Final tightening of the screw with the appliance in position is normally and preferably delayed for a few

minutes further, up to a total of ten minutes setting time.

5 The fabric piece 26 may be in the form of a short tape or strip as indicated in Figure 2, and be wound around the plug in the manner shown in Figure 4 thereby in effect to enlarge its diameter.

10 Alternatively, and preferably, the fabric piece is in the form of a circular disc 30 as shown in Figure 3, in which case the disc 30 may be placed against the closed end of the plastic plug 16 and then be smoothed axially along the length of the plug as indicated in Figure 5, thereby to achieve a substantially uniform close engagement of the fabric piece around the plug.

15 An alternative procedure may be used instead if desired. Instead of applying the fabric piece 30 (or even 26) to the plug 16, then wetting it and forcing the plug enveloped in the fabric piece into the hole 20, the fabric piece 30 is first wetted to start the hardening process, and then
20 placed centrally over the defective hole 20, as shown in Figure 6, whereafter the plug 16 is pressed against the centre of the fabric piece thereby to carry the fabric piece with the plug as it is forced longitudinally into the defective hole, the fabric piece and filler material again
25 filling the spaces between the plug 16 and the hole 20. Any unwanted parts of the fabric which protrude from the hole may be trimmed away with scissors or a craft knife.

30 Whilst in Figure 3 the fabric piece 30 is circular in shape (as preferred), other quasi-circular shapes (polygonal for example) may be used instead, and even substantially square fabric pieces.

35 Where the oversizing of the drilled hole 20 is substantial, it may require the use of two (or possibly more) fabric pieces 26 or 30 lying on top of one another to provide the requisite amount of fabric and filler material to fill the

spaces between the hole 20 and the plug 16. In this case, the process may require a slightly longer time (possibly as much as ten minutes) to achieve satisfactory securing of the plug, depending on how oversized the hole 20 is and thus how many pieces of filler-carrying fabric 26 or 30 needed to be used.

For use in practising the method of the present invention, there may be provided in a suitable water-proof package 32 a plurality of fabric pieces 26 or 30 of similar sizes, or as desired - assorted sizes. The fabric pieces may be separate one from another, ready for withdrawal one by one from the package.

Alternatively, the package 32 may enclose filler-carrying fabric in the form of a tape (or strip) 34, which tape has been weakened transversely (e.g. by perforations) at positions 36 spaced along the length of the tape so as to enable separate pieces 38 of the tape to be readily detached. For convenience the tape may be wound in the form of a roll 40 as shown in Figure 8. Alternatively, the tape may be folded repeatedly upon itself at the weakened positions 36 and packaged in fan-fold manner, as shown at 42 in Figure 9.

The packages preferably include closure means (not shown) for resealing them in a water-proof manner after withdrawing a fabric piece.

Preferably, the packages carry within them or externally thereon a set of instructions for using the enclosed fabric pieces in accordance with the principles of the present invention.

It will be appreciated that the method of the present invention may be used in any situation where a plastic (or other) plug has to be disposed in any larger-than-desired hole.

Whilst the above description is directed to the securing of a wood screw in a plastic plug, the procedure described there is equally applicable to the securing of such a screw in any form of plug, whether it be of a plastics material, wood, or a metal. Furthermore, the procedure may be used in the same manner for securing plug devices intended for use with plasterboard panels, or for plugs intended to receive nails (instead of screws).

Moreover, the procedure described above may equally be used in respect of a bolt having a screw-threaded cylindrical shank and intended to form part of a masonry bolt device, or part of a plug device intended for use with plasterboard panels.

By quick-setting filler material is meant material that has typically a setting time of up to about ten minutes.

Fabric for use in practising the present invention may comprise fibres of cotton, or any suitable synthetic plastics material (e.g. polypropylene), or even carbon or glass, and may be woven or knitted in any suitable manner, regularly or randomly. Fabric of the kind known as "leno" weave fabric is particularly suitable. Gauze fabrics are also useful in the present context.

The quick-setting filler material may be any suitable material derived from gypsum, and which can be consolidated on and/or within the intertices of the woven fabric. Other water-activated filler materials may be used instead. If desired, short (preferably less than 5mm in length), strength-enhancing fibres of glass, carbon or other suitable material may be mixed in with the filler material.

For convenience of the user, there may be provided, and marketed as such, ready-made (pre-prepared) units (Figure 10) each comprising a screw-receiving plug 16, carrying thereon a sleeve 46, preferably closed at one end,

of a loosely-woven fabric having consolidated thereon a said dry, water-activated, quick-setting filler material. The plug is similar to that shown (16) in the Figures 3 and 4, whilst the fabric and filler are similar to those (26-30) used in the Figures 2 and 3. The sleeve 46 is retained on the plug 16 by radial retaining projections 48 formed on the plug (also seen in Figures 4 and 5); if desired the sleeve may be secured instead by an adhesive.

One form of water-activated filler-carrying fabric (as referred to above) is currently used in the medical field, for the making of splints and casts. For example, plaster of Paris bandage commercially available under the trade mark "GYPSONA" from the company 'Smith and Nephew' has been successfully used in experiments with methods according to the present invention. It is described as comprising a 'leno weave gauze cotton' which carries gypsum.

Methods according to the above-described embodiment of the present invention have the advantages that they are simple, involve only simple non-damaging chemical materials, and are relatively swift to practise.

In a second embodiment of the present invention, the method of securing the plug 16 in the hole 20 is generally similar to that described in the above-described first embodiment, with the exception that the filler material 28 comprises instead an air-activated synthetic resin material, e.g. polyurethane resin. In this case activation of the filler material starts with the withdrawal of the filler-impregnated woven fabric 26,28 from its air-tight storage enclosure. Hence, there should be no appreciable delay in inserting the plug 16 with its enclosing filler-impregnated fabric 26,28 into the hole 20.

There is likewise currently available for use in the medical field, for the making of splints and casts, a loosely-woven fabric 26 carrying an air-activated filler

material 28. That material is currently available under the trade name "DYNACAST EXTRA" from the company 'Smith & Nephew'. It is described as comprising a 'fibreglass knitted substrate' carrying a filler material comprising 'low tack polyurethane resin'. This second material has been successfully used in experiments concerning the present invention.

This second embodiment has the disadvantage compared with the first embodiment that the woven fabric carrying the resin filler material is relatively expensive, may adversely affect the user's skin, and needs greater care in handling it because of its sensitivity to air, which could result in premature hardening of the filler material before being brought into use.

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CLAIMS

1. A method of securing a plug (16) in an over-sized preformed hole (20) comprises the steps of: (a) providing
5 at least one piece of a loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is sized to envelop at least circumferentially the plug (16) intended to be used; (b) enveloping the plug (16) at least
10 circumferentially in the fabric piece (26 or 30); (c) causing activation of the filler material (28) thereby to initiate hardening and eventual setting of the filler material (28); and (d) inserting the enveloped plug (16,26,28) without delay in the oversized hole (20) in a
15 manner such as to ensure filling of the oversized hole (20) with the enveloped plug (16,26,28).

2. A method according to claim 1, wherein the filler material (28) is air activated, and step (c) precedes step
20 (b).

3. A method according to claim 2, wherein the filler material comprises a polyurethane resin.

25 4. A method according to claim 1, wherein the filler material (28) is water activated, and step (b) precedes step (c).

30 5. A method according to claim 4, wherein the filler material comprises plaster of Paris.

6. A method according to claim 4, wherein the filler material (28) comprises a quick-setting material manufactured from gypsum, other than plaster of Paris.

35 7. A method according to any one of the claims 1 to 6, wherein the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other

suitable material.

8. A method according to any one of the claims 1 to 7,
wherein the fabric piece (26) is in the form of a tape or
5 strip, and is wound on to the plug (16) thereby to envelop
it circumferentially.

9. A method according to any one of claims 1 to 7,
wherein the fabric piece (30) is circular in shape, or
10 substantially so, and is placed over the closed end of the
plug (16) and then smoothed longitudinally along the plug
(16) to the open end thereof so as to envelop the plug (16)
circumferentially in a substantially uniform manner.

10. Means for use in practising a method according to any
preceding claim, comprising a piece of a loosely-woven
fabric (26 or 30) carrying consolidated thereon a quick-
setting filler material (28), which fabric piece (26 or 30)
is shaped and sized for use with a plug of a particular
20 selected size.

11. Means according to claim 10, wherein the the filler
material has mixed in with it short, strength-enhancing
fibres of glass, carbon or other suitable material.

12. Means according to claim 10 for use in a method
according to claim 9, wherein the piece of filler-carrying
fabric (30) is circular in shape, or substantially so.

13. Means according to claim 10 for use in a method
according to claim 8, wherein the piece of filler-carrying
fabric (26) is rectangular in shape, or substantially so.

14. Means for use in practising a method according to any
one of the claims 1 to 8, comprising a piece of a loosely-
woven fabric (26 or 30) carrying consolidated thereon a
quick-setting filler material (28), which fabric piece (26
or 30) is in the form of a tape (34) which is transversely

weakened at positions (36) spaced along the tape (34) to enable ready detachment of successive pieces (38) as desired for use in practising any of the methods.

5 15. Means according to claim 14, wherein the the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other suitable material.

10 16. Means according to claim 14, wherein the tape (34) is wound in the form of a roll (40).

15 17. Means according to claim 14, wherein the tape (34) is folded upon itself at said weakened positions (36) in a fan-fold manner.

20 18. Means according to any one of the claims 10 to 17, wherein the filler-carrying fabric piece or pieces (26,30,38) are enclosed in an enclosure means (32) arranged to prevent premature activation of the filler material.

25 19. Means according to claim 18, wherein the enclosure means (32) incorporates a resealable closure means for enabling withdrawal of individual fabric piece (26,30,38) one at a time.

30 20. Means according to claim 18 or 19, wherein the enclosure means (32) carries within or externally thereon printed instructions setting out the manner of using the fabric pieces.

35 21. A method of securing a screw (14) in an over-sized preformed hole (20) comprising a method according to any one of the claims 1 to 9, and a subsequent step, after the elapse of the requisite filler-hardening time, of inserting the screw (14) in the plug (16) and screwing it home therein, the screw (14) being of a size intended for the size of the plug (16).

22. For use in any one of the methods of claim 1 to 9, a pre-prepared unit (44) comprising a plug (16) carrying around it a sleeve of a loosely-woven fabric having consolidated thereon a quick-setting filler material (28).

5

23. A unit according to claim 22, wherein the the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other suitable material.

10

24. A method according to any one of the claims 1 to 9 and 21, substantially as hereinbefore described with reference to, and as illustrated by, the accompanying diagrammatic drawings.

15

25. Means according to any one of the claims 10 to 20, 22 and 23, substantially as hereinbefore described with reference to, and as illustrated by, the accompanying diagrammatic drawings.

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FOOTNOTES

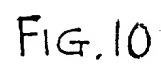
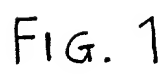
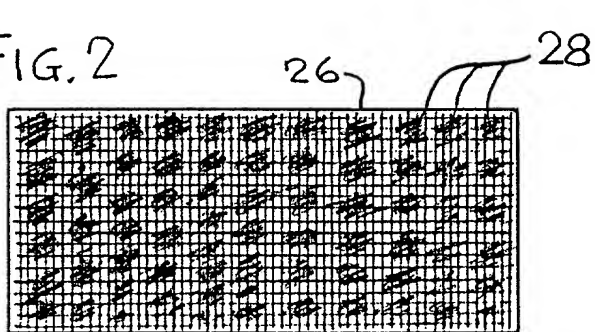


FIG. 2



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FIG. 3

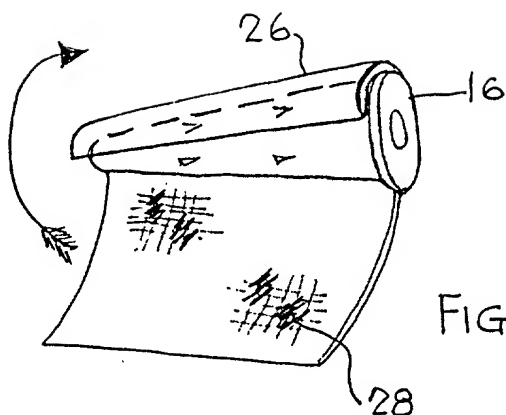
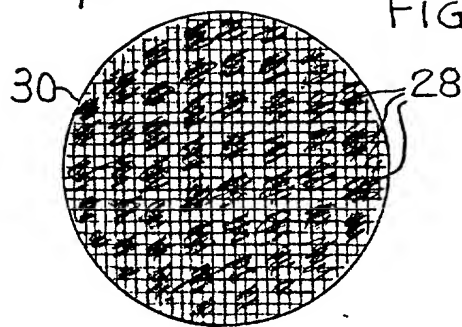


FIG. 4

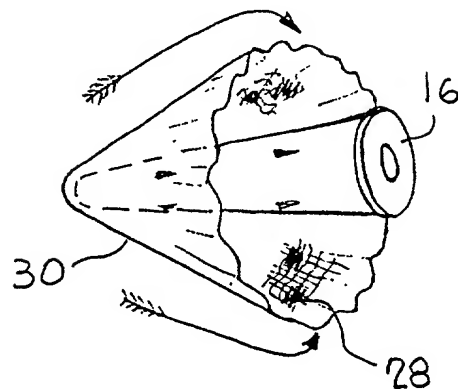


FIG. 5

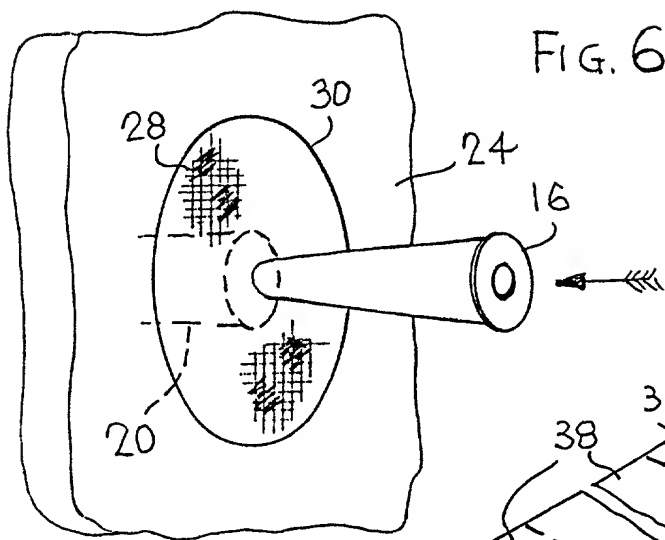


FIG. 6

FIG. 8

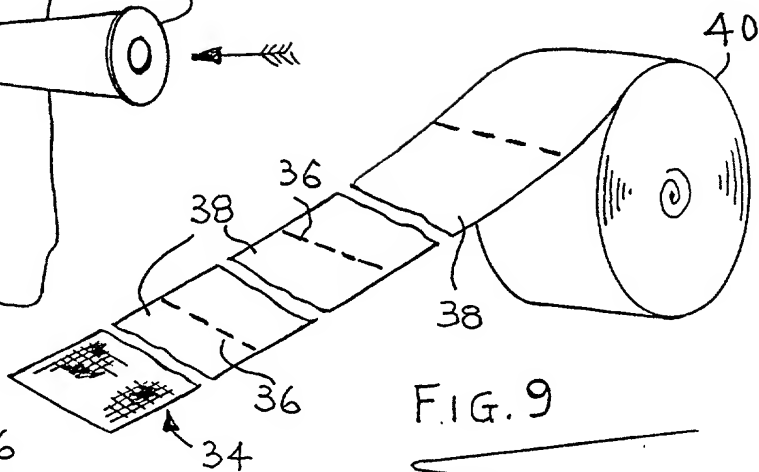


FIG. 7

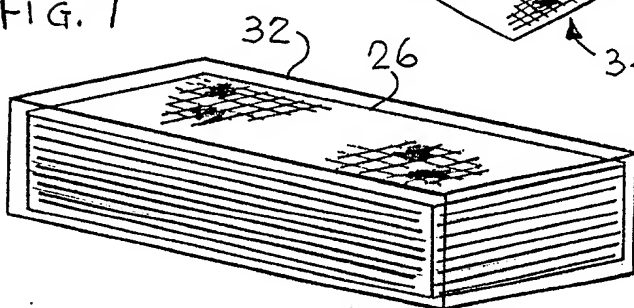
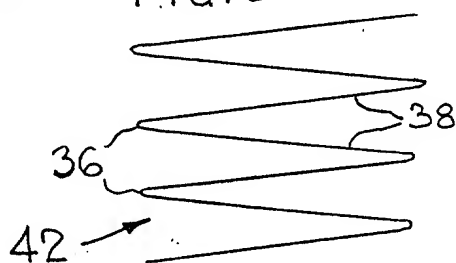


FIG. 9



SIGNED DECLARATION

PTO/SB/01 (10-01)

Approved for use through 10/31/2002. OMB 0851-0032

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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☒ Declaration Submitted with Initial Filing
OR
☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number

First Named Inventor

Stephenson, Alan

COMPLETE IF KNOWN

Application Number

Filing Date

Art Unit

Examiner Name

As the below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SECURING PLUGS IN OVER-SIZED HOLES

(Title of the invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY)

06/14/2000

as United States Application Number or PCT International

Application Number PCT/GB00/02298 and was amended on (MM/DD/YYYY) (If applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 306(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
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☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

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Signature

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Residence: City

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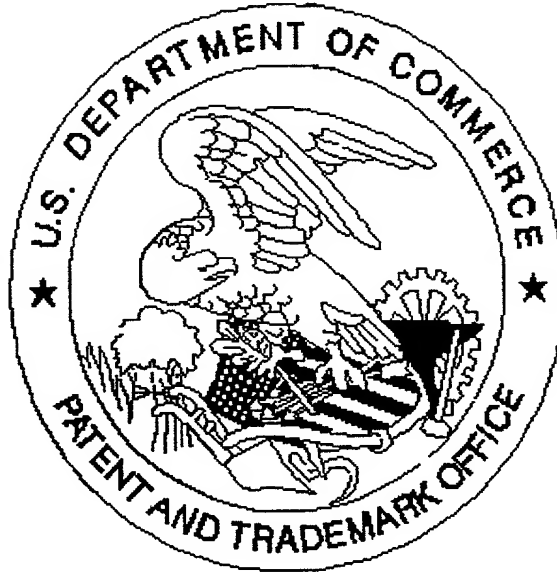
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